n-VERSION OF HAPPEL REITEN SMALØ TILTING THEOREM AND APPLICATIONS

LUISA FIOROT

In this talk we plan to present a result which is a joint work with Francesco Mattiello and Manuel Saorín:

Tilting Theorem. *Let $\mathcal{A}$ be an abelian category whose derived category $D(\mathcal{A})$ has Hom sets, let $\mathcal{D}$ be its natural t-structure and $\mathcal{T}$ another t-structure on $D(\mathcal{A})$ such that $\mathcal{D}^{\leq -n} \subseteq \mathcal{T}^{\leq 0} \subseteq \mathcal{D}^{\leq 0}$ for some $n \in \mathbb{N}$. If the class $\mathcal{Y} = \mathcal{T}^{\leq 0} \cap \mathcal{D}^{\geq 0} = \mathcal{A} \cap \mathcal{H}_{\mathcal{T}}$ is cogenerating in $\mathcal{A}$, then the inclusion functor $\mathcal{H}_{\mathcal{T}} \hookrightarrow D(\mathcal{A})$ extends to a triangulated equivalence*

$$D(\mathcal{H}_{\mathcal{T}}) \xrightarrow{\cong} D(\mathcal{A})$$

and $\mathcal{Y}$ is generating in $\mathcal{H}_{\mathcal{T}}$.

Applications to nonclassical tilting objects. This theorem applies to the case of an abelian category $\mathcal{A}$ such that its derived category $D(\mathcal{A})$ has Hom sets and arbitrary (small) coproducts endowed with T a (non classical) tilting object in $\mathcal{A}$. Let denote by $\mathcal{T}$ be the t-structure associated to the tilting T. The hypotheses of the previous Theorem are satisfied and so the inclusion functor $\mathcal{H}_{\mathcal{T}} \hookrightarrow D(\mathcal{A})$ extends to a triangulated equivalence

$$D(\mathcal{H}_{\mathcal{T}}) \xrightarrow{\cong} D(\mathcal{A}).$$

This result admits a straightforward dualization to cotilting objects in abelian categories whose derived category has Hom sets and arbitrary products.

The previous results are included in the paper: L. Fiorot, F. Mattiello, and M. Saorín, *Derived Equivalences induced by nonclassical tilting objects*, ArXiv: 1511.06148v2.

Applications to $n = 2$. I will propose some personal applications of this Tilting Theorem for $n = 2$. This last part is a work in progress.

Dip. Matematica Pura ed Applicata, Università degli studi di Padova, via Trieste 63, I-35121 Padova Italy

E-mail address: fiorot@math.unipd.it